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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/771,660	01/30/2001	Neville John Hazell	Q62781	8164

7590 10/05/2004

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EXAMINER

KIM, DAVID S

ART UNIT PAPER NUMBER

2633

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/771,660

Applicant(s)

HAZELL ET AL.

Examiner

David S. Kim

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 January 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1/30/01, 5/25/01.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claims 22-23** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite in that it fails to point out what is included or excluded by the claim language. These claims are omnibus type claims.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 1-6, 9-13, and 16** are rejected under 35 U.S.C. 102(b) as being anticipated by Delavaux et al. (European Patent Application EP 0684 709 A1, hereinafter “Delavaux”).

Regarding claim 1, Delavaux discloses:

A method of dispersion compensation (Fig. 8) comprising the steps of:

receiving an optical signal having a number of channels separated by wavelength (WDM signal input into optical circulator 101); and,

applying dispersion compensation (dispersion compensation units 105, 107, and 109) over at least one predetermined wavelength band independently of wavelengths outside the wavelength band, wherein

the wavelength band spans a plurality of channels numbering less than the total number of channels in the signal.

Regarding claim 2, Delavaux discloses:

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A method according to claim 1, further comprising the steps of:
splitting the plurality of channels into two or more wavelength bands (WDM multiplexer/demultiplexer 81 in Fig. 8);

propagating the two or more wavelength bands along separate optical paths (dispersion compensation units 105, 107, and 109), wherein dispersion compensation is applied in at least one of the optical paths; and, subsequently re-combining the signals at an optical output (WDM multiplexer/demultiplexer 81).

Regarding claim 3, Delavaux discloses:

A method according to claim 2, in which the signal carried by at least one of the optical paths is amplified to compensate for losses (col. 5, l. 41-46).

Regarding claim 4, Delavaux discloses:

A method according to claim 1, in which dispersion compensation is provided by means of a number of lengths of dispersion compensating optical fibre (col. 5, l. 47-48).

Regarding claim 5, Delavaux discloses:

A method according to claim 1, including the step of:
passing the entire optical signal (via optical circulator 101) through a band-selective dispersion compensation element adapted to apply dispersion compensation only to channels within a predetermined wavelength band.

Regarding claim 6, Delavaux discloses:

A method according to claim 5, in which channels outside the predetermined wavelength band are reflected by a separate optical element (mirrors 117).

Regarding claim 9, Delavaux discloses:

A dispersion compensation device (Fig. 8) for applying dispersion compensation to an optical signal having a number of channels (WDM signal input into optical circulator 101), comprising a dispersion compensation element (various groupings of dispersion compensation

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units 105, 107, and 109) which is configured to apply dispersion compensation only to a predetermined wavelength band independently of wavelengths outside the wavelength band, the predetermined wavelength band spanning a plurality of channels numbering less than the total number of channels of the optical signal.

Regarding claim 10, Delavaux discloses:

A device according to claim 9, further comprising a band splitter (WDM multiplexer/demultiplexer 81 in Fig. 8) arranged to feed two or more optical paths, wherein least one of optical paths comprises a dispersion compensation element (dispersion compensation units 105, 107, and 109).

Regarding claim 11, Delavaux discloses:

A device according to claims 9, in which the dispersion compensation element comprises a length of dispersion compensating optical fibre (col. 5, l. 47-48).

Regarding claim 12, Delavaux discloses:

A device according to claim 9, further comprising an optical coupler (optical circulator 101) arranged to feed an optical signal received at an optical input to an optical path having a dispersion compensation element (dispersion compensation units 105, 107, and 109 and mirrors 117), the dispersion compensation element being adapted to apply dispersion compensation to a number channels within a limited bandwidth and reflect signals (mirrors 117) within that bandwidth to an optical output of the optical coupler.

Regarding claim 13, Delavaux discloses:

A device according to claim 12, in which the optical coupler is an optical circulator (optical circulator 101).

Regarding claim 16, Delavaux discloses:

A device according to claim 9, in which the dispersion compensation device further comprises an optical reflector (mirrors 117) coupled to the dispersion compensating element to

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reflect optical signals outside of the predetermined bandwidth to the optical output of the optical coupler.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. **Claims 7-8, 14-15, and 17-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Delavaux.

Regarding claim 7, Delavaux does not expressly disclose:

A method according to claim 5, in which the dispersion compensating element is a photorefractive element or a diffraction grating.

However, it is known that alternative types of dispersion compensating elements include photorefractive elements and diffraction gratings. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to consider such alternative dispersion compensating elements. One of ordinary skill in the art would have been motivated to do this to offer design flexibility in the practice of the method of Delavaux, according to the practical

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constraints of a practitioner in any number of factors, such as equipment costs, available equipment, space, and individual expertise.

Regarding claim 8, Delavaux does not expressly disclose:

A method according to claim 1, further comprising the step of:

imposing a uniform delay to a particular wavelength band to compensate for relative dispersion between the particular wavelength band and a second different wavelength band.

However, Delavaux does teach that relative dispersion (col. 1, l. 21-24) results from the effect of light at different wavelengths traveling at different velocities within optical fiber (including dispersion compensating fiber). As the different wavelength bands of Delavaux (dispersion compensation units 105, 107, and 109) encounter different amounts of dispersion compensation in their respective dispersion compensation elements, it inherently follows that the temporal positions of the propagating signals in these wavelength bands may shift with respect to each other, resulting in relative dispersion between different bands. In other words, the signals in these wavelength bands maybe temporally misaligned, or “out of phase.” Delavaux also teaches adjustment means for phase (col. 5, l. 41-47). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to compensate for such relative dispersion between the different wavelength bands by imposing appropriate amounts of uniform delay (bit pattern delaying, col. 5, l. 41-47) to each band. One of ordinary skill in the art would have been motivated to do this since so that the signals in these wavelength bands may be temporally aligned, or “in phase.” Such alignment is important for communication systems that rely on synchronous processes to handle multi-channel WDM signals.

Regarding claims 14-15, claims 14 and 15 introduce limitations that correspond to limitations introduced by claim 7. An obviousness argument is applied to address these limitations in claim 7. A similar argument is applied here to claims 14-15.

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Regarding claims 17, claim 17 introduces limitations that correspond to limitations introduced by claim 8. An obviousness argument is applied to address these limitations in claim 8. A similar argument is applied here to claims 17.

Regarding claim 18, Delavaux does not expressly disclose:

A device according to claim 17, in which the delay element is a length of optical fibre coupled between the dispersion compensation element and the optical reflector.

However, it is a well-known technique to implement a delay in optical communication systems with a length of optical fibre. Such delay elements are commonly known as optical fiber delay lines. In the device of Delavaux, note that the dispersion compensating element already comprises a length of optical fiber between the dispersion compensation element and the optical reflector. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to implement this length of optical fiber as the delay element. One of ordinary skill in the art would have been motivated to do this since the device of Delavaux already comprises the necessary components (length of optical fiber); appropriate selection of fiber length is technically trivial and intuitively obvious.

8. **Claims 19-21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshimura (U.S. Patent No. 5,793,917) in view of Delavaux.

Regarding claim 19, Yoshimura discloses:

A dispersion compensating device (Figs. 4-5) comprising a housing having at least one spool of dispersion compensation fibre arranged axially within the housing so as to provide a passage extending along a length of the housing through the core of the spool.

Yoshimura does not expressly disclose:

said dispersion compensating device being according to claim 9.

Delavaux discloses a dispersion compensating device according to claim 9 (see treatment of claim 9 above). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to incorporate the dispersion compensating teachings of Delavaux in the dispersion compensating device of Yoshimura. One of ordinary skill in the art would have been motivated to do this since Delavaux teaches the implementation of dynamic dispersion compensation (Delavaux, col. 3, l. 40 – col. 4, l. 18) as an improvement over static dispersion compensation (Delavaux, col. 1, l. 42 – col. 2, l. 13), as shown in Yoshimura (note that the dispersion compensation elements are simply placed along the transmission line without any additional control in Fig. 4).

Regarding claim 20, Yoshimura in view of Delavaux discloses:

A device according to claim 19, in which the housing is a submarine housing (abstract).

Regarding claim 21, Yoshimura discloses:

A device according to claim 20, in which the submarine housing is a casing for an optical repeater (col. 6, l. 51-63).

Conclusion

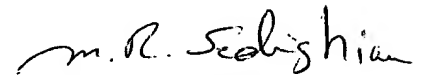
Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Kim whose telephone number is 571-272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571-272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DSK


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PRIMARY EXAMINER